

REMARKS

In the Office Action, the Examiner rejected claims 1 and 4-10 under 35 USC § 102 and claims 2, 3 and 11-18 under 35 USC § 103. These rejections are fully traversed below.

Claims 1, 5 and 9 have been amended. Claim 1 has been amended to further clarify and distinctly claim the subject matter regarded as the invention. Claim 5 has been amended to include the limitations from dependent claims 7 and 8. Claim 9 has been amended to correct its dependency. Claims 2, 3, 7 and 8 have been cancelled. Claims 21-24 have been added. Thus, claims 1, 4-6, 9-20 and 21-24 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

Election/Restriction

The undersigned affirms the election of group I, claims 1-18.

Drawings

Figures 1A and 1B have been amended to include --Prior Art--. A redline version of these figures is enclosed herewith.

ISSUES UNDER 35 USC 102(b)

Claims 1 and 4-8 have been rejected under 35 U.S.C. §102(b) as being anticipated by *Prall et al.* (U.S. 5,958,796).

In contrast to *Prall*, claim 1 (and its dependents) specifically requires, "...removing unwanted particles from the back side of the wafer in order to maintain the desired relationship between the backside of the wafer and a chucking surface..." While *Prall* may disclose removing waste matter on the backside of a wafer, *Prall* does not teach or suggest removing waste matter on the backside of the wafer for the purpose of maintaining the desired relationship between the backside of the wafer and a chucking surface. For one, *Prall* is completely silent to a chucking surface. For another, it appears *Prall* only teaches removing waste matter for the purpose of preventing wafer warpage. For example, *Prall* states, "The waste matter on the

backside of the wafer may cause the silicon wafer to warp because internal stresses in the lattice structure of the waste matter tend to bend the thin flexible silicon wafer (Col. 1, lines 51-55).” *Prall* is also silent to “...placing the wafer on a chucking surface after removing the unwanted particles from the back side of the wafer...” as required by claim 1. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In a related note, the Examiner asserted that while *Prall* does not specifically emphasize the issue of preventing gaps between the backside of the wafer and a chucking surface he does indicate that waste matter from the backside of the wafer is removed by planarizing, which removes any scratches and produces a uniformly planar polished surface. It appears, however, that the Examiner constructed this assertion out of isolated teachings within *Prall*. The Examiner referred to a paragraph in *Prall* bridging col. 4 and 5, as well as col. 5 lines 48-53 in order to support the assertion. These sections, however, are directed to opposite sides of the wafer. The paragraph bridging col. 4 and 5 is directed at the backside and col. 5 lines 48-53 are directed at the front side that includes the cover. The paragraph related to the front side (Col. 5 lines 48-53) does mention producing a uniformly planar polished surface. The paragraph related to the backside (paragraph bridging col. 4 and 5), however, does not mention producing a uniformly planar polished surface. Thus, *Prall* does not teach or suggest planarizing the backside of the wafer to produce a uniformly planar polished surface as indicated by the Examiner. It should be noted that the Federal Circuit has repeatedly warned against using the applicant’s disclosure as a blueprint to reconstruct the claimed invention out of isolated teachings in the prior art. See, for example, *Grain Processing Corp. v. American Maize-products*, 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988).

Also in contrast to *Prall*, claim 5 (and its dependents) specifically requires, “...providing a semi-dry cleaning module for cleaning the backside of the wafer ...” and “...cleaning the backside of the wafer in the semi-dry cleaning module to remove particles therefrom, wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer ...” While *Prall* may disclose methods of cleaning the backside of a wafer, *Prall* does not teach or suggest semi-dry cleaning. As defined in the specification on page 8 lines 2-5, “In the semi-dry cleaning process, an alcohol or water based solution is aggressively applied to the backside of the wafer so as to wash away (e.g., collect) dust and/or deposits that are stuck to the backside of the wafer.” No such process is mentioned in *Prall*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Although the rejections to the dependent claims 4 and 6 should be withdrawn for at least the reasons as above, it should be noted that they offer additional language that is unsupported by the art.

Claims 1 and 4-10 have been rejected under 35 U.S.C. §102(b) as being anticipated by *La et al.* (U.S. 5,958,796).

In contrast to *La*, claim 1 (and its dependents) specifically requires, "...removing unwanted particles from the back side of the wafer in order to maintain the desired relationship between the backside of the wafer and a chucking surface..." While *La* may disclose scrubbing a wafer prior to photolithography, *La* does not teach or suggest scrubbing the backside of the wafer for the purpose of maintaining the desired relationship between the backside of the wafer and a chucking surface. Like *Prall*, *La* is completely silent to a chucking surface. *La* is also silent to "...placing the wafer on a chucking surface after removing the unwanted particles from the back side of the wafer..." as required by claim 1. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *La*, claim 5 (and its dependents) specifically requires, "...cleaning the backside of the wafer in the semi-dry cleaning module to remove particles therefrom, wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer..." While *La* may disclose scrubbing a wafer prior to photolithography, *La* does not teach or suggest only cleaning the backside of a wafer. In *La*, both sides of the wafer are scrubbed. *La* states, "The present invention comprises a less severe and more cost effective solution for reducing photolithographic failures by performing a double-sided scrubbing operation using conventional in place equipment...(Col. 3, lines 59-62)." *La* relies on U.S. Pat. No. 5,442,828 to further describe double sided wafer scrubbers (see Col. 4, line 17). In this patent, the following is stated:

A conventional double-sided scrubber system has two brush stations that allow for a more thorough cleaning of wafers. A spin station is used to rinse and dry both sides of a wafer without contacting the wafer surfaces. A robot is included that grips cleaned wafers on the edges and places each wafer on a blade that lowers into a wafer cassette. The cassette is positioned on its back to allow a laminar air flow through the cassette. The brushes are constantly flushed with deionized water to inhibit particle buildup. An indexer accepts a cassette of wafers from a previous

operation, such as polishing, and will transmit a wafer from the cassette to the cleaning, rinsing and drying stations when appropriate (Col. 1, lines 43-56).

As described, both sides of the wafer are rinsed and dried. *La* further describes the backside scrubbing of the double sided scrubbing in Col. 4, lines 1-6 where he states, "backside scrubbing is effected by processing only the backside of the wafer by a scrubbing operation employing a brush...such as a brush of a conventional double sided brushing apparatus." This particular paragraph does not disclose only backside brushing as asserted by the Examiner, but rather it further defines one part (backside scrubbing) of the two part process (double sided scrubbing). Again it is stated, "backside scrubbing is effected by processing only the backside of the wafer." This does not exclude process side scrubbing as in claim 5 (e.g., wherein only the backside of the wafer is cleaned so as not to damage the process side of the wafer). In fact, one may say that the double side approach of *La* teaches away from the single side approach of claim 5. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Although the rejections to the dependent claims 4, 6, 9 and 10 should be withdrawn for at least the reasons as above, it should be noted that they offer additional language that is unsupported by the art.

ISSUES UNDER 35 USC 103(a)

Claims 2, 3, 11, 12, 14-18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Prall et al.* (U.S. Patent No. 5,958,796) in view of *Guo et al.* (U.S. Patent No. 6,251,759).

Claims 2 and 3 have been canceled. However, it is still believed that the rejections to these claims should be withdrawn for at least the reason given above with regards to *Prall*. That is, *Guo* does not overcome the deficiencies of *Prall*. Neither reference teaches or suggests removing un-wanted particles from the back side of the wafer in order to maintain the desired relationship between the backside of the wafer and a chucking surface as required by claim 1. *Guo* is completely silent to removing unwanted particles from the backside of a wafer, and while *Prall* may disclose removing waste matter on the backside of a wafer, *Prall* does not teach or suggest removing waste matter on the backside of the wafer for the purpose of maintaining the desired relationship between the backside of the wafer and a chucking surface. Again the

Examiner asserted that while *Prall* does not specifically emphasize the issue of preventing gaps between the backside of the wafer and a chucking surface he does indicate that waste matter from the backside of the wafer is removed by planarizing, which removes any scratches and produces a uniformly planar polished surface, thus eliminating any contact discrepancy between the wafer and its supporting surface such as a chucking surface... This, however, is incorrect for the reasons give above. That is, the backside is not planarized to produce a uniformly planar polished surface, but rather the front side is planarized to produce a uniformly planar polished surface. It appears that the Examiner used the claimed invention as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention, i.e., improperly combined isolated teachings related to the front and back sides of the wafer. Accordingly, the rejection is unsupported by the art and should be withdrawn.

It is also believed that the rejections to claims 11, 12, 14-18 should be withdrawn for at least the reason given above. Neither reference teaches or suggests providing a semi-dry cleaning module for cleaning the backside of the wafer ...cleaning the backside of the wafer in the semi-dry cleaning module to remove particles therefrom, wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer ...as required by claim 5. Both references fail to teach or suggest semi-dry cleaning. As defined in the specification on page 8 lines 2-5, "In the semi-dry cleaning process, an alcohol or water based solution is aggressively applied to the backside of the wafer so as to wash away (e.g., collect) dust and/or deposits that are stuck to the backside of the wafer." No such process is mentioned in *Prall* or *Guo*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 2, 3, 11, 13, 14 and 16-18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *La et al.* (U.S. Patent No. 6,136,510) in view of *Loan et al.* (U.S. Patent No. 6,136,725).

Claims 2 and 3 have been canceled. However, it is still believed that the rejections to these claims should be withdrawn for at least the reason given above with regards to *La*. That is, *Loan* does not overcome the defencies of *La*. Neither reference teaches or suggests removing un-wanted particles from the back side of the wafer in order to maintain the desired relationship between the backside of the wafer and a chucking surface..." Accordingly, the rejection is unsupported by the art and should be withdrawn.

It is also believed that the rejections to claims 11, 13, 14, and 16-18 should be withdrawn for at least the reason given above. Neither reference teaches or suggests providing a semi-dry cleaning module for cleaning the backside of the wafer ...cleaning the backside of the wafer in the semi-dry cleaning module to remove particles therefrom, wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer ...as required by claim 5. Both references fail to teach or suggest only cleaning the backside of the wafer. *Loan* is completely silent to cleaning the backside of the wafer and while *La* may disclose scrubbing a wafer prior to photolithography, *La* does not teach or suggest only cleaning the backside of a wafer. In *La*, both sides of the wafer are scrubbed. In fact, one may say that the double side approach of *La* teaches away from the single side approach of claim 5. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 13 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Prall* and *Guo* and in view of *Loan* et al. (U.S. Patent No. 6,136,725).

It is believed that this rejection should be withdrawn for at least the reason given above. None of the references teaches or suggests providing a semi-dry cleaning module for cleaning the backside of the wafer ...cleaning the backside of the wafer in the semi-dry cleaning module to remove particles therefrom, wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer ...as required by claim 5. Accordingly, the rejection is unsupported by the art and should be withdrawn.

SUMMARY

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read "Q Hoellwarth", written in a cursive style.

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APPENDIX

1. (Once Amended) A method of processing a wafer **having a process side and a back side**, comprising:

[receiving a wafer having a process side and a back side;]

removing un-wanted particles from the back side of the wafer **in order to maintain the desired relationship between the backside of the wafer and a chucking surface**;

placing the wafer on a chucking surface after removing the unwanted particles from the back side of the wafer;

[thereafter] performing a specific processing task on the process side of the wafer for the first time **after placing the wafer on the chucking surface**.

5. (Once Amended) A method of processing a wafer having a process side and a backside opposite the process side, the method comprising:

providing a **semi-dry** cleaning module for cleaning the backside of the wafer and a processing module for performing a processing task on the process side of the wafer;

receiving [a] **the** wafer for processing;

loading the wafer into the cleaning module;

cleaning the backside of the wafer in the **semi-dry** cleaning module to remove particles therefrom, **wherein only the backside of the wafer is cleaned in the semi dry cleaning module so as not to damage the process side of the wafer**;

transferring the wafer to the processing module;

loading the wafer into the processing module; and

performing the processing task on the process side of the wafer in the processing module.

9. (Once Amended) The method as recited in claim [8] 5 wherein cleaning the backside of the wafer in the semi-dry cleaning module comprises:

providing a brush for scrubbing the backside of the wafer and an applicator for delivering a cleaning solution to the backside of the wafer;

positioning the brush against the backside of the wafer;

flowing the cleaning solution between the backside of the wafer and the brush; and

moving the brush relative to the wafer so as to force particles off the backside of the wafer.

